

Feb. 23, 1954

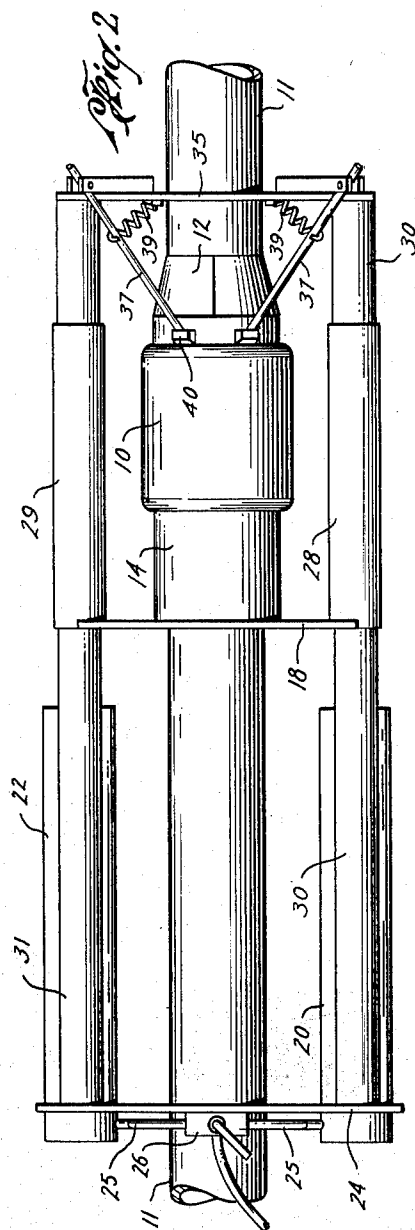
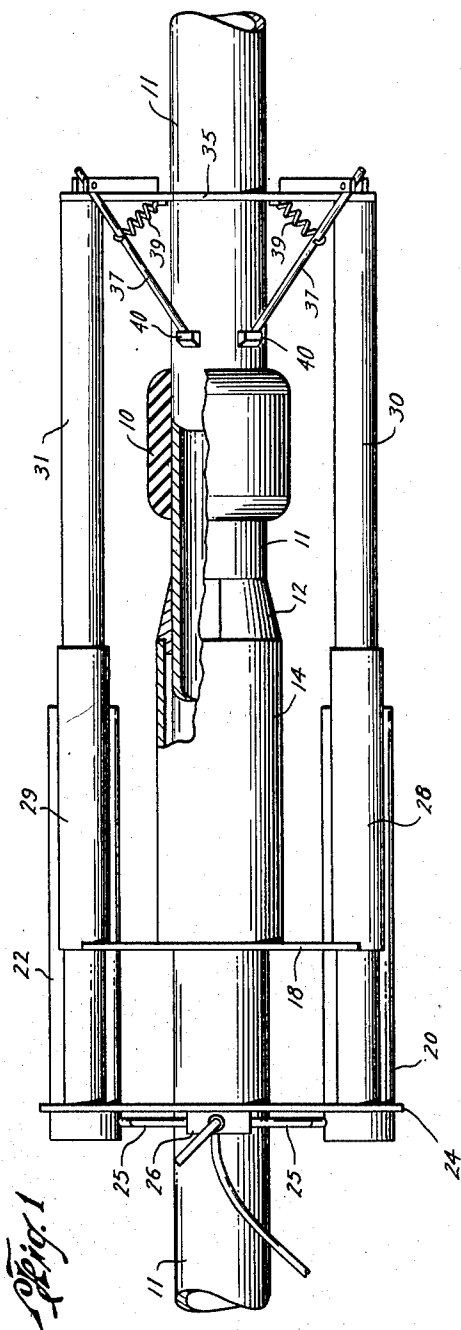
B. G. PRICE

2,669,773

MEANS FOR TRANSFERRING COLLARS

Filed April 16, 1951

3 Sheets-Sheet 1



Berry Glenn Price
INVENTOR.

BY Thomas O. Arnold

ATTORNEY

Feb. 23, 1954

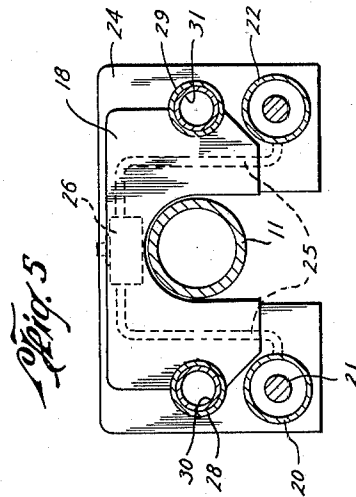
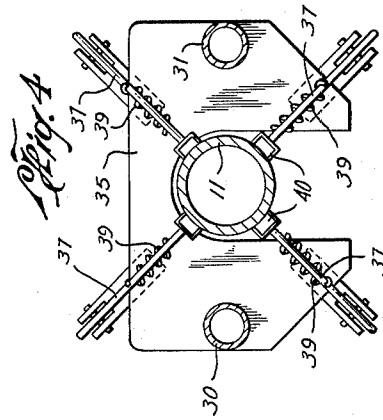
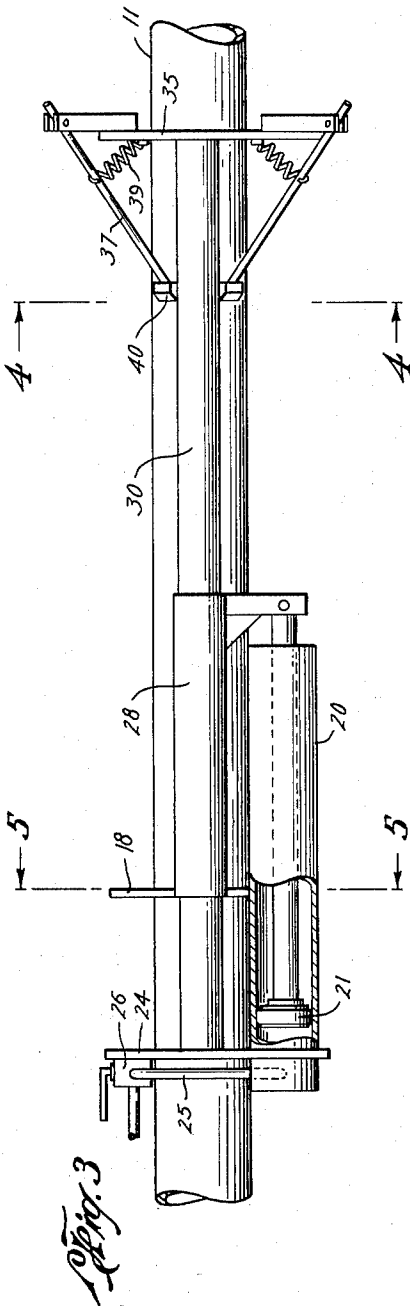
B. G. PRICE

2,669,773

MEANS FOR TRANSFERRING COLLARS

Filed April 16, 1951

3 Sheets-Sheet 2



Berry Glenn Price
INVENTOR.

BY Thomas O. Arnold

ATTORNEY

Feb. 23, 1954

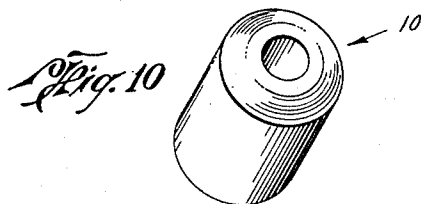
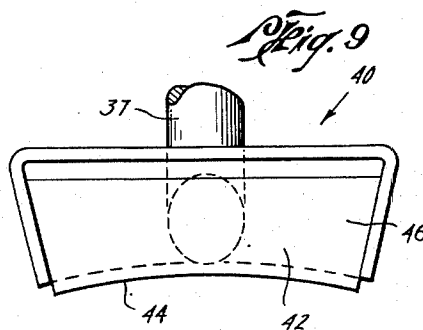
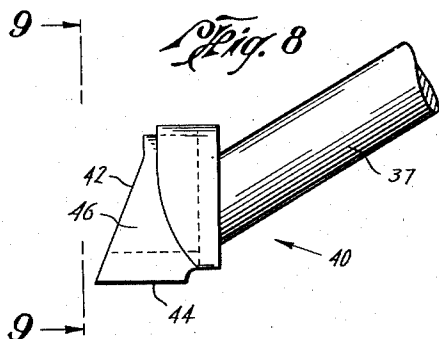
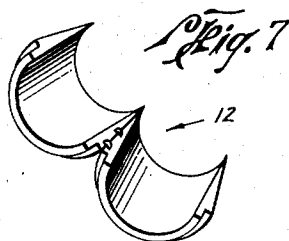
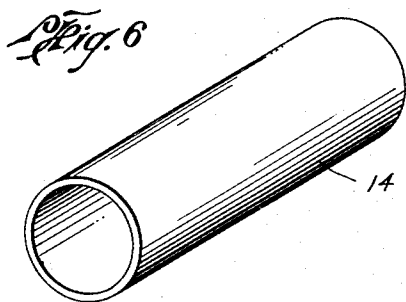
B. G. PRICE

2,669,773

MEANS FOR TRANSFERRING COLLARS

Filed April 16, 1951

3 Sheets-Sheet 3



Berry Glenn Price
INVENTOR.

BY Thomas O. Arnold

ATTORNEY

UNITED STATES PATENT OFFICE

2,669,773

MEANS FOR TRANSFERRING COLLARS

Berry Glenn Price, Houston, Tex., assignor, by
mesne assignments, to Tuboscope Company,
Harris County, Tex., a corporation of Delaware

Application April 16, 1951, Serial No. 221,210

1 Claim. (Cl. 29—236)

1

This invention relates to means for removing expansible collars from cylinders, and more particularly to means for removing resilient protectors from drill pipe.

It is a common practice in the oil industry today to place protectors in the form of rings or collars of resilient material, such as rubber, on oil well drill pipe during drilling operations. Such protectors prevent metal to metal contact between the drill pipe and the oil well casing, thus insuring longer life for both the casing and the drill pipe. It often occurs that the collars must be removed from the drill pipe, but since the collars must grip the pipe very firmly during drilling they are difficult to remove. Heretofore, all means for removing collars from drill pipe have resulted in damage to a significant percentage of the protectors.

Therefore, an object of this invention is to provide a device for removing protector collars from cylinders such as drill pipe which will not damage the collars.

A further object of this invention is to provide a device of the type described which is easily portable and may be used on pipe in a rack with a minimum of pipe handling.

Another object of this invention is to provide a device which can be used to place collars on a given cylinder as well as to remove collars from a cylinder.

Other objects will be apparent from the following description and accompanying drawings wherein:

Figure 1 is a plan view of the invention positioned for removal of a collar from a piece of drill pipe.

Figure 2 is a plan view of the invention after it has been operated to move the collar onto the cylindrical sleeve.

Figure 3 is an elevational view of the invention and a section of drill pipe positioned therein, but with the cylindrical sleeve and tapered sleeve not shown.

Figure 4 is a section taken along line 4—4 in Figure 3.

Figure 5 is a section taken along line 5—5 in Figure 3.

Figure 6 is a pictorial view of a cylindrical sleeve which is a part of the invention.

Figure 7 is a pictorial view of a segmented frustrum of a cone, or tapered or conical sleeve, which is a part of the invention, in its open position.

Figure 8 is a side elevational detail of a foot which is a part of the invention.

2

Figure 9 is a front elevational detail of a foot.

Figure 10 is a pictorial view of an unstretched protector collar before being placed on a piece of drill pipe.

A preferred embodiment of the invention illustrated in the drawings contemplates the removal of protector collars 10 from drill pipe 11 by sliding them over a frustrum of a cone or tapered or conical sleeve 12 onto a cylindrical sleeve 14. The conical sleeve 12 is preferably split or cut into two parts by a plane containing the axis thereof. The two parts are hinged together on one side as illustrated in Figure 7, so that it may conveniently be closed around a piece of drill pipe 11. The bore or inside diameter of the split conical sleeve 12 is substantially equal to the outside diameter of the drill pipe 11. The small end of the conical sleeve 12 is shaped into a dull knife edge so that it may easily slide under the protector collar 10 but so that it will not cut the collar. The large end or base of the conical sleeve 12 is adapted to fit snugly against one end of the cylindrical sleeve 14.

The cylindrical transfer sleeve 14 is sufficiently large to enable it to pass over protrusions on the surface of the drill pipe 11. The outside surface of the cylindrical sleeve 14 and of the conical sleeve 12 are both smooth to permit the collar 10 to slide onto them easily.

Means for pushing the cylindrical sleeve 14 and the conical sleeve 12 toward and into the collar 10 are provided. Such means may take the form of a push plate 18 which is provided with a slot large enough to receive the drill pipe 11 as illustrated in Figure 5.

Means are also provided for moving the push plate 18. A gear and rack device (not shown) or a hydraulic system such as that illustrated in the drawings is convenient. A first hydraulic cylinder 20 with a piston 21 is positioned on one side of the push plate 18; a second hydraulic cylinder 22 with a piston (not shown) is positioned on the other side of the push plate 18. The two hydraulic cylinders 20 and 22 are secured to a front plate 24 which is provided with an inverted U slot to receive drill pipe, similar to the slot in the push plate 18, as illustrated in Figure 5. The cylinders 20 and 22 are connected together by a hydraulic line 25 which is in turn connected to a valve 26. The valve 26 controls admittance of hydraulic fluid to the cylinders 20 and 22.

The two pistons are connected by their piston rods to a bracket extension from each of a pair

3

of push plate sleeves 28 and 29. The push plate sleeves 28 and 29 are slidably mounted on guide rods 30 and 31 respectively. The guide rods 30 and 31 are secured to the front plate 24 in a position substantially parallel to the hydraulic cylinders 20 and 22, and substantially parallel to the drill pipe 11 when it is in position. The push plate sleeves 28 and 29 are secured to the respective sides of the push plate 18. As hydraulic fluid is admitted through the valve 26 to the cylinders 20 and 22, the pistons move outward causing the push plate sleeves 28 and 29 to move the push plate 18. The push plate 18 in turn pushes the cylindrical sleeve 14 which pushes the conical sleeve 12.

It is apparent that the push plate 18 and the push plate sleeves 28 and 29 form a single structural unit.

Means for engaging the protector collar 10 on the side away from the conical sleeve 12 and the cylindrical sleeve 14 are provided. Such means may take the form of a back plate 35 on which a plurality of pushers or arms 37 are hinged mounted. Four arms are used in the embodiment illustrated. As shown in Figure 4 the back plate 35 is provided with a slot to receive the pipe 16, and is connected to the guide rods 30 and 31 so that the front plate 24, the two guide rods 30 and 31 and the back plate 35 constitute a rigid structural unit and form a sort of box framework for the entire device.

Each of the arms 37 move in a plane containing the axis of the drill pipe 11 and make a predetermined angle with the axis of the drill pipe when engaged with the surface thereof. The size of this angle is important to the best operation of the invention and is preferably within the range of 20 to 40 degrees. The arms 37 may be resiliently urged against the drill pipe 16 by springs 39.

Feet 40 are provided on the ends of the arms 37. The feet 40 must be constructed so as to avoid pinching the collar 10 as it pushes against the collar and the drill pipe 11, and as it pushes against the collar and the cone 12. Preferably the face 42 and the base 44, sometimes referred to as a second face, of the feet 40 are surfaces of a block 46 of a material which is resilient, such as rubber, but which is somewhat less resilient than the collar 10 itself. Further the face 42 of the feet 40 is preferably substantially plane, and does not carry any protrusion designed to slide under the collar 10.

The curvature of the base 44 of the resilient block 46 may approximate the curvature of the drill pipe 11. Any rigid backing for the face preferably has a radius of curvature approximately equal to the radius of the cylindrical sleeve 14.

In the operation of the invention the cylindrical sleeve 14 is slid over the end of the drill pipe 11 nearly to the collar 10 which is to be removed. The split conical sleeve 12 is placed around the pipe 11 and fitted against the cylindrical sleeve 14 between the cylindrical sleeve and the collar 10. The framework comprising front plate 24, the two guide rods 30 and 31 and the back plate 35 is then lifted, together with the parts affixed thereto, and placed over the drill pipe in the position shown in Figure 1. Some external source (not shown) of hydraulic pressure is connected to the valve 26 which is opened to permit admission of hydraulic fluid to the cylinders 20 and 22.

As the pistons move down the cylinders 20 and 22 away from the front plate 24, they push the push plate sleeves 28 and 29 which in turn move

4

the push plate 18, causing the cylindrical sleeve 14 and the conical sleeve 12 to move toward the back plate 35 and the feet 40. The front and back plates are not fastened to the drill pipe 11, so the back plate 35 and the push plate 18 both slide along the drill pipe 16 until the collar 10 is engaged by the feet 40 on one side and by the edge of the cone 12 on the other. As the pistons move further, the feet 40 and the conical sleeve 12 squeeze the collar 10 between them until it slides over the conical sleeve 12 and onto the cylindrical sleeve 14. The conical sleeve 12 continues its motion toward the back plate 35 until the feet 40 have pushed the trailing edge of the collar 10 over the conical sleeve 12 and onto the cylindrical sleeve 14.

Once the collar 10 has been moved onto the cylindrical sleeve 14, the framework is lifted off the pipe, the conical sleeve 12 is opened and removed from pipe, and the cylindrical sleeve 14 with the protector 10 is slid off the end of the pipe 16.

It is apparent that once a collar 10 has been stretched onto a cylindrical sleeve 14, the cylindrical sleeve 14 and the conical sleeve 12 can be positioned on any cylinder 11 of appropriate size and the collar 10 transferred to the new cylinder 11. Further, a new collar 10 may be placed around a piece of drill pipe 11 by commencing the operation with the collar 10 around a pipe or other cylinder of sufficiently small diameter that the collar 10 does not have to be stretched to be placed in position.

If the cylindrical sleeve 14 and conical sleeve 12 have a sufficiently smooth surface, and if the surfaces thereof are lubricated with such a lubricant as soap before the collar is stretched, the collar 10 will slide down the conical sleeve 12 and off of the cylindrical sleeve 14 without pushing. Once the edge of the collar 10 is moved over the end of the cylindrical sleeve 14 onto the conical sleeve 12. Those skilled in the art will find it easy to move the collar 10 along the smooth and lubricated surface of the cylindrical sleeve 14 until the end of it is over the conical sleeve 12.

The device herein described has the advantages of being easily portable and usable on pipe in a rack. The careful selection of the angle which the arms 37 make with the drill pipe 11 and the shape and resiliency of the feet 40 along with other factors inherent in the construction of this invention insure against damage to collars to an extent not previously known in the industry. The device may be used not only to move protectors to or from drill pipe, but also to move any type of resilient collar to or from other cylindrical surfaces.

Many modifications may be made in the invention as described herein without departure from the scope thereof. It is, therefore, apparent that this description is illustrative only and is not to be construed in any limiting sense.

I claim:

In a device for removing an expansible collar from a length of pipe, the combination of a conical sleeve with internal diameter substantially equivalent to the outside diameter of said pipe and comprising two parts hingedly secured together whereby said conical sleeve may be placed around said pipe; a cylindrical sleeve with internal diameter greater than the maximum outside diameter of said pipe and with outside diameter substantially equivalent to the maximum outside diameter of said conical sleeve, said cylindrical sleeve being movable over said pipe and

5

6

being adapted to abut and cooperate with said conical sleeve while surrounding the pipe; a first structural unit comprising a push plate adapted to abut the second end of said cylindrical sleeve and having a U slot therein adapted to receive said pipe, together with a first push plate sleeve and a second push plate sleeve both secured to said push plate; a second structural unit comprising a first guide rod passing through said first push plate sleeve and a second guide rod passing through said second push plate sleeve together with a front plate secured to one end of each of said guide rods and having a U slot therein adapted to receive said pipe and a back plate secured to the other end of each of said guide rods and having a U slot therein adapted to receive said pipe; said structural units being adapted to sit loosely on said pipe and to slide easily thereon; a plurality of arms with first and second ends, said arms being hingedly mounted at said first ends to said back plate so as to make an angle with the axis of said pipe within a predetermined range; a plurality of feet, one secured to the second end of each of said arms, said feet comprising a first face adapted to engage said expansible collar and a second face adapted to engage said pipe, conical sleeve and

cylindrical sleeve, both of said faces being of resilient material and substantially free from any protrusion, and said feet being positioned between said back plate and said push plate and adapted to slide upon the surface of said pipe, conical sleeve and cylindrical sleeve while pushing against said expansible collar; means operable between said first structural unit and said second structural unit for causing said push plate sleeves, push plate, cylindrical sleeve and conical sleeve to move toward said feet; whereby said expansible collar may be squeezed between said feet and said conical sleeve and moved over said conical sleeve onto said cylindrical sleeve in one continuous single step operation.

BERRY GLENN PRICE.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
889,315	Kenyon	June 2, 1908
2,252,692	Barnes et al.	Aug. 19, 1941
2,263,778	Howard	Nov. 25, 1941
2,291,251	Norris	July 28, 1942
2,320,553	Barnes et al.	June 1, 1943
2,327,088	Barnes	Aug. 17, 1943